

## Abstract

A device and software system with input and output capability for manipulating real and virtual objects in 3-dimensional space. The device consists of a six degree-of-freedom mechanical armature that has sensors to determine the location and orientation of a stylus and planar surface. In the input mode, manipulation of the physical armature will result in a corresponding two-dimensional, virtual image of the stylus and surface on a computer screen. The armature also has motors to automatically change the armature location and orientation in order to generate a physical representation in the real world of the location and orientation of a virtual object. The armature is built so that it maintains balance at any location and orientation to statically maintain the armature location and orientation without drifting to a null rest position.